

WHAT IS CLAIMED IS:

1. A system for automatically updating graphical user interface (GUI) elements at a client system according to an updated state of a configuration, the system comprising one or more software components at the client system operable to:

5 display a GUI element at the client system in connection with a configuration workflow, the GUI element being associated with a configuration choice involving a configuration element of a configuration model stored at a server system;

create and maintain at the client system a connector linking a property of the configuration element of the configuration model to the GUI element;

10 maintain at the client system configuration data representing a current state of a configuration in relation to the configuration model;

in response to user input during the configuration workflow, receive data from the server system representing an update to the current state of the configuration with respect to the property of the configuration element; and

15 use the connector linking the property of the configuration element to the GUI element to cause the GUI element to be automatically updated to reflect the updated state of the configuration with respect to the property of the configuration element.

2. The system of Claim 1, wherein the connector is created automatically
20 at the client system in response to the GUI element being generated for display at the client system.

3. The system of Claim 1, wherein the connector allows the GUI element
25 to be automatically updated to reflect the updated state of the configuration without requiring data associated with any properties of any configuration elements unaffected by the user input to be communicated from the server system to the client system and without requiring any GUI elements unaffected by the update to be updated.

4. The system of Claim 1, wherein:

the configuration model comprises a plurality of configuration elements, each configuration choice involving one or more configuration elements each having one or more configuration element properties; and

5 the software components are further operable to create and maintain at the client system a separate connector for each configuration element property that is to be linked to one of a plurality of GUI elements, such that each configuration element property may be linked to one or more GUI elements using separate connectors and each GUI element may be linked to one or more configuration element properties
10 using separate connectors.

5. The system of Claim 1, wherein code used to create the connector at the client system comprises a format string as a parameter, the format string allowing for Hypertext Markup Language (HTML) formatting of the GUI element linked to the
15 connector according to the format string.

6. The system of Claim 1, wherein code used to create the connector at the client system comprises a format string comprising JavaScript code, the format string allowing:

20 the updated state of the configuration to be determined in response to user input associated with the GUI element linked to the connector; and

if appropriate according to the updated state of the configuration, a different Hypertext Markup Language (HTML) class to be used for displaying the GUI element linked to the connector.

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7. The system of Claim 1, wherein code used to create the connector at the client system comprises a format string comprising JavaScript code, the format string allowing information associated with a configuration element specified in the format string to be obtained and used.

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8. The system of Claim 1, wherein the software components are further operable to create and maintain at the client system:

a connector linking specified Hypertext Markup Language (HTML) layer content to a JavaScript function, the connector operable to be used to call the JavaScript function in response to user input associated with the HTML content to indicate the user input;

a connector linking a specified HTML layer property to the JavaScript function, the connector operable to be used to call the JavaScript function in response to user input associated with the HTML layer to indicate the user input; and

a connector linking the JavaScript function to a callback operable to communicate the indicated user input to the server system and, in response, receive the data representing the update from the server system.

9. The system of Claim 1, wherein the one or more software components comprise:

a first frame associated with a web page and generated at the server system for communication to the client system upon initiation of the configuration workflow, the first frame operable to:

maintain the connector at the client system;

store the data representing the update to maintain configuration data representing the updated current state of the configuration at the client system;

according to the data representing the update, determine the property of the configuration element;

determine the connector for the property; and

using the connector for the property, update the GUI element linked to the property; and

a second frame associated with the web page and generated at the server system for communication to the client system in association with the first frame, the second frame comprising the GUI element linked to the property.

10. The system of Claim 9, further comprising a third frame associated with the web page and generated at the server system for communication to the client system in association with the first and second frames, when executed at the client system the third frame operable to:

- 5 receive from the second frame data representing a selection associated with the GUI element, the selection affecting the property of the configuration element;
post the data received from the second frame as a Hypertext Transfer Protocol (HTTP) request to the server system;
receive an HTTP response from the server system comprising data reflecting
10 the update to the current state of the configuration resulting from the selection; and
communicate the data received from the server system to the second frame to initiate updating of the GUI element.

11. The system of Claim 9, wherein the system consists of the web page
15 comprising the first and second frames.

12. The system of Claim 1, wherein the one or more software components comprise:

- 20 a first frame associated with a web page and generated at the server system for communication to the client system upon initiation of the configuration workflow, the first frame comprising a plurality of functions each operable when executed at the client system in response to a call to create a connector for a corresponding type of GUI element; and

- 25 a second frame associated with the web page and generated at the server system for communication to the client system in association with the first frame, the second frame comprising code associated with the GUI element and operable to, in response to the GUI element being initially generated for display, automatically call the function in the first frame that corresponds to the type of the GUI element to create the connector for the GUI element.

13. The system of Claim 12, wherein the first and second frames comprise JavaServer Pages (JSPs), the called functions of the first frame comprise JavaScript functions, and the calling code of the second frame comprises JavaScript code.

5 14. The system of Claim 1, wherein the one or more software components comprise:

a first non-viewable configuration application program interface (API) frame associated with a web page and generated at the server system for communication to the client system in response to a user initiating the configuration workflow; and

10 one of a plurality of second viewable configuration dialog frames associated with the web page and generated at the server system for communication to the client system in association with the first frame in response to the user initiating the configuration workflow.

15 15. The system of Claim 1, wherein the configuration is a configuration for a product, the configuration choice is associated with one or more configuration elements available for selection in configuring a corresponding portion of the product, and the configuration model is a product configuration model.

20 16. The system of Claim 1, wherein the GUI element is associated with a dynamic Hypertext Markup Language (DHTML) layer and comprises one of a text label, a text field, a text area, a radio button, a drop-down list box, a check box, and an image.

17. A method for automatically updating a graphical user interface (GUI) element at a client system according to an updated state of a configuration, comprising:

5 displaying a GUI element at the client system in connection with a configuration workflow, the GUI element being associated with a configuration choice involving a configuration element of a configuration model stored at a server system;

creating and maintaining at the client system a connector linking a property of the configuration element of the configuration model to the GUI element;

10 maintaining at the client system configuration data representing a current state of a configuration in relation to the configuration model;

in response to user input during the configuration workflow, receiving data from the server system representing an update to the current state of the configuration with respect to the property of the configuration element; and

15 using the connector linking the property of the configuration element to the GUI element to cause the GUI element to be automatically updated to reflect the updated state of the configuration with respect to the property of the configuration element.

20 18. The method of Claim 17, wherein the connector is created automatically at the client system in response to the GUI element being generated for display at the client system.

25 19. The method of Claim 17, wherein the connector allows the GUI element to be automatically updated to reflect the updated state of the configuration without requiring data associated with any properties of any configuration elements unaffected by the user input to be communicated from the server system to the client system and without requiring any GUI elements unaffected by the update to be updated.

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20. The method of Claim 17, wherein:

the configuration model comprises a plurality of configuration elements, each configuration choice involving one or more configuration elements each having one or more configuration element properties; and

5 the method further comprises creating and maintaining at the client system a separate connector for each configuration element property that is to be linked to one of a plurality of GUI elements, such that each configuration element property may be linked to one or more GUI elements using separate connectors and each GUI element may be linked to one or more configuration element properties using separate
10 connectors.

21. The method of Claim 17, wherein code used to create the connector at the client system comprises a format string as a parameter, the format string allowing for Hypertext Markup Language (HTML) formatting of the GUI element linked to the
15 connector according to the format string.

22. The method of Claim 17, wherein code used to create the connector at the client system comprises a format string comprising JavaScript code, the format string allowing:

20 the updated state of the configuration to be determined in response to user input associated with the GUI element linked to the connector; and

if appropriate according to the updated state of the configuration, a different Hypertext Markup Language (HTML) class to be used for displaying the GUI element linked to the connector.

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23. The method of Claim 17, wherein code used to create the connector at the client system comprises a format string comprising JavaScript code, the format string allowing information associated with a configuration element specified in the format string to be obtained and used.

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24. The method of Claim 17, further comprising create and maintain at the client system:

a connector linking specified Hypertext Markup Language (HTML) layer content to a JavaScript function, the connector operable to be used to call the JavaScript function in response to user input associated with the HTML content to indicate the user input;

a connector linking a specified HTML layer property to the JavaScript function, the connector operable to be used to call the JavaScript function in response to user input associated with the HTML layer to indicate the user input; and

a connector linking the JavaScript function to a callback operable to communicate the indicated user input to the server system and, in response, receive the data representing the update from the server system.

25. The method of Claim 17, further comprising:

loading at the client system a first frame associated with a web page and generated at the server system for communication to the client system upon initiation of the configuration workflow, the first frame operable to:

maintain the connector at the client system;

store the data representing the update to maintain configuration data representing the updated current state of the configuration at the client system;

according to the data representing the update, determine the property of the configuration element;

determine the connector for the property; and

use the connector for the property to update the GUI element linked to the property; and

loading at the client system a second frame associated with the web page and generated at the server system for communication to the client system in association with the first frame, the second frame comprising the GUI element linked to the property.

26. The method of Claim 25, further comprising loading at the client system a third frame associated with the web page and generated at the server system for communication to the client system in association with the first and second frames, when executed at the client system the third frame operable to:

- 5 receive from the second frame data representing a selection associated with the GUI element, the selection affecting the property of the configuration element;
post the data received from the second frame as a Hypertext Transfer Protocol (HTTP) request to the server system;
receive an HTTP response from the server system comprising data reflecting
10 the update to the current state of the configuration resulting from the selection; and
communicate the data received from the server system to the second frame to initiate updating of the GUI element.

27. The method of Claim 25, wherein:

- 15 the first frame comprises a non-viewable configuration application program interface (API) frame; and
the second frame is one of a plurality of viewable configuration dialog frames associated with the web page and generated at the server system for communication to the client system in association with the first frame in response to the user initiating
20 the configuration workflow.

28. The method of Claim 17, further comprising:

loading at the client system a first frame associated with a web page and generated at the server system for communication to the client system upon initiation of the configuration workflow, the first frame comprising a plurality of functions each operable when executed at the client system in response to a call to create a connector
5 for a corresponding type of GUI element; and

loading at the client system a second frame associated with the web page and generated at the server system for communication to the client system in association with the first frame, the second frame comprising code associated with the GUI
10 element and operable to, in response to the GUI element being initially generated for display, automatically call the function in the first frame that corresponds to the type of the GUI element to create the connector for the GUI element.

29. The method of Claim 28, wherein the first and second frames comprise
15 JavaServer Pages (JSPs), the called functions of the first frame comprise JavaScript functions, and the calling code of the second frame comprises JavaScript code.

30. The method of Claim 17, wherein the configuration is a configuration for a product, the configuration choice is associated with one or more configuration
20 elements available for selection in configuring a corresponding portion of the product, and the configuration model is a product configuration model.

31. The method of Claim 17, wherein the GUI element is associated with a dynamic Hypertext Markup Language (DHTML) layer and comprises one of a text
25 label, a text field, a text area, a radio button, a drop-down list box, a check box, and an image.

32. Software for automatically updating graphical user interface (GUI) elements at a client system according to an updated state of a configuration, the software being embodied in computer-readable media and when executed operable to:

5 display a GUI element at the client system in connection with a configuration workflow, the GUI element being associated with a configuration choice involving a configuration element of a configuration model stored at a server system;

create and maintain at the client system a connector linking a property of the configuration element of the configuration model to the GUI element;

10 maintain at the client system configuration data representing a current state of a configuration in relation to the configuration model;

in response to user input during the configuration workflow, receive data from the server system representing an update to the current state of the configuration with respect to the property of the configuration element; and

15 use the connector linking the property of the configuration element to the GUI element to cause the GUI element to be automatically updated to reflect the updated state of the configuration with respect to the property of the configuration element.

33. The software of Claim 32, wherein the connector is created automatically at the client system in response to the GUI element being generated for
20 display at the client system.

34. The software of Claim 32, wherein the connector allows the GUI element to be automatically updated to reflect the updated state of the configuration without requiring data associated with any properties of any configuration elements
25 unaffected by the user input to be communicated from the server system to the client system and without requiring any GUI elements unaffected by the update to be updated.

35. The software of Claim 32, wherein:

the configuration model comprises a plurality of configuration elements, each configuration choice involving one or more configuration elements each having one or more configuration element properties; and

5 the software is further operable to create and maintain at the client system a separate connector for each configuration element property that is to be linked to one of a plurality of GUI elements, such that each configuration element property may be linked to one or more GUI elements using separate connectors and each GUI element may be linked to one or more configuration element properties using separate
10 connectors.

36. The software of Claim 32, wherein code used to create the connector at the client system comprises a format string as a parameter, the format string allowing for Hypertext Markup Language (HTML) formatting of the GUI element linked to the
15 connector according to the format string.

37. The software of Claim 32, wherein code used to create the connector at the client system comprises a format string comprising JavaScript code, the format string allowing:

20 the updated state of the configuration to be determined in response to user input associated with the GUI element linked to the connector; and

if appropriate according to the updated state of the configuration, a different Hypertext Markup Language (HTML) class to be used for displaying the GUI element linked to the connector.

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38. The software of Claim 32, wherein code used to create the connector at the client system comprises a format string comprising JavaScript code, the format string allowing information associated with a configuration element specified in the format string to be obtained and used.

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39. The software of Claim 32, further operable to create and maintain at the client system:

a connector linking specified Hypertext Markup Language (HTML) layer content to a JavaScript function, the connector operable to be used to call the JavaScript function in response to user input associated with the HTML content to
5 indicate the user input;

a connector linking a specified HTML layer property to the JavaScript function, the connector operable to be used to call the JavaScript function in response to user input associated with the HTML layer to indicate the user input; and

10 a connector linking the JavaScript function to a callback operable to communicate the indicated user input to the server system and, in response, receive the data representing the update from the server system.

40. The software of Claim 32, comprising:

15 a first frame associated with a web page and generated at the server system for communication to the client system upon initiation of the configuration workflow, the first frame operable to:

maintain the connector at the client system;

store the data representing the update to maintain configuration data
20 representing the updated current state of the configuration at the client system;

according to the data representing the update, determine the property of the configuration element;

determine the connector for the property; and

25 using the connector for the property to update the GUI element linked to the property; and

a second frame associated with the web page and generated at the server system for communication to the client system in association with the first frame, the second frame comprising the GUI element linked to the property.

41. The software of Claim 40, further comprising a third frame associated with the web page and generated at the server system for communication to the client system in association with the first and second frames, when executed at the client system the third frame operable to:

- 5 receive from the second frame data representing a selection associated with the GUI element, the selection affecting the property of the configuration element;
post the data received from the second frame as a Hypertext Transfer Protocol (HTTP) request to the server system;
receive an HTTP response from the server system comprising data reflecting
10 the update to the current state of the configuration resulting from the selection; and
communicate the data received from the server system to the second frame to initiate updating of the GUI element.

42. The software of Claim 40, wherein the software consists of the web
15 page comprising the first and second frames.

43. The software of Claim 32, comprising:
a first frame associated with a web page and generated at the server system for communication to the client system upon initiation of the configuration workflow, the
20 first frame comprising a plurality of functions each operable when executed at the client system in response to a call to create a connector for a corresponding type of GUI element; and
a second frame associated with the web page and generated at the server system for communication to the client system in association with the first frame, the
25 second frame comprising code associated with the GUI element and operable to, in response to the GUI element being initially generated for display, automatically call the function in the first frame that corresponds to the type of the GUI element to create the connector for the GUI element.

44. The software of Claim 43, wherein the first and second frames comprise JavaServer Pages (JSPs), the called functions of the first frame comprise JavaScript functions, and the calling code of the second frame comprises JavaScript code.

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45. The software of Claim 32, comprising:

a first non-viewable configuration application program interface (API) frame associated with a web page and generated at the server system for communication to the client system in response to a user initiating the configuration workflow; and

10 one of a plurality of second viewable configuration dialog frames associated with the web page and generated at the server system for communication to the client system in association with the first frame in response to the user initiating the configuration workflow.

15 46. The software of Claim 32, wherein the configuration is a configuration for a product, the configuration choice is associated with one or more configuration elements available for selection in configuring a corresponding portion of the product, and the configuration model is a product configuration model.

20 47. The software of Claim 32, wherein the GUI element is associated with a dynamic Hypertext Markup Language (DHTML) layer and comprises one of a text label, a text field, a text area, a radio button, a drop-down list box, a check box, and an image.

48. A system for automatically updating graphical user interface (GUI) elements at a client system according to an updated state of a configuration, comprising:

5 means for displaying a GUI element at the client system in connection with a configuration workflow, the GUI element being associated with a configuration choice involving a configuration element of a configuration model stored at a server system;

means for creating and maintaining at the client system a connector linking a property of the configuration element of the configuration model to the GUI element;

10 means for maintaining at the client system configuration data representing a current state of a configuration in relation to the configuration model;

means for receiving, in response to user input during the configuration workflow, data from the server system representing an update to the current state of the configuration with respect to the property of the configuration element; and

15 means for using the connector linking the property of the configuration element to the GUI element to cause the GUI element to be automatically updated to reflect the updated state of the configuration with respect to the property of the configuration element.

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